NONLETHAL CONTROL TECHNIQUES USED TO MANAGE BLACKBIRD DAMAGE TO SUNFLOWER

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Abstract: Since 1986, nonlethal management techniques have been used by the North Dakota and South Dakota Animal Damage Control programs to reduce blackbird damage to sunflower. The use of propane cannons, pyrotechnics, hazing, and cattail management is discussed. Currently, the primary program for both States is cattail management.

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Sunflowers have been cultivated by American Indians for over 30 centuries and the Mandan Tribe was cultivating sunflower in North Dakota in the 1800s (Putt 1978). The use of sunflowers for food was widespread among tribes from the arctic circle to the tropics and from the Missouri River to the Pacific Ocean (Harvard 1895).

Canada led the way during the 1930s in developing lines of sunflower seed for their oil content (Putt 1978). By 1948, oil varieties of sunflowers from Manitoba were grown in North Dakota and Minnesota (Putt 1978). In the 1960s, sunflower production became more popular in the agriculture community with the advent of higher oil content in the seeds and the discovery of cytoplasmic male sterility (Putt 1978). The majority of U.S.-produced sunflowers are grown in the prairie pothole region of North Dakota and South Dakota. North Dakota sunflower production peaked in 1979 with 3.46 million acres and South Dakota sunflower production peaked in 1993 with 630,000 acres (Flaskerud 1994). Today North Dakota continues to lead the nation in production of sunflowers with South Dakota coming in second.

The common cattail (*Typha latifolia*) is the native cattail of the prairie pothole region in North America and appears in the literature as early as 1836 (Kantrud 1992). Common cattails were found on the edges of wetlands and in bogs and seldom if ever dominated a wetland. Narrow-leaved cattails (*T. angustifolia*) began expanding its range from the east coast in the early part of the 20th century (Kantrud 1992). Narrow-leaved cattails were not present in North Dakota until the 1940s (Stevens 1963, Kantrud 1992), but soon after entering North Dakota, the plant began hybridizing (*T.* x *glauca*) with the common cattail (Kantrud 1992). The hybrid began to rapidly spread throughout the prairie pothole system during the 1950s and dominated wetlands attributable to its increased tolerance of saline wetlands (Kantrud 1992). Some animals, especially blackbirds (Icterinae), benefited from the invasion of the hybrid cattail, due to increased amounts of breeding habitat.

Red-winged blackbirds (*Agelaius phoeniceus*), yellow-headed blackbirds (*Xanthocephalus xanthocephalus*), and common grackles (*Quiscalus quiscula*) have all benefited from the spread of cattails. By 1993, the North Dakota breeding populations of blackbirds were estimated to be 1.54 million pairs of red-winged blackbirds, 651,000 pairs of common grackles, and 373,000 pairs of yellow-headed blackbirds (Igl and Johnson 1997).

Besser (1985) stated the majority of sunflower damage is caused by blackbirds that breed and produce young within 160 km of the sunflower fields. Stehn (1989) reported that red-winged blackbirds were primary species responsible for sunflower damage in North Dakota. Stehn's (1989) estimated that the pre-breeding population of blackbirds in southern Manitoba, northwestern Minnesota, and the eastern half of North Dakota to be 9.1 million red-winged blackbirds and the fall population to be 13.2 million red-winged blackbirds.

The combination of blackbirds, sunflowers, and cattails has resulted in significant financial impact to the sunflower industry (Hothem et al. 1988). The U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Animal Damage Control (ADC) has had Congressionally-directed funds available for blackbird damage reduction since 1986 (Handegard 1988). The majority of these funds have been expended for nonlethal blackbird damage management in the Dakotas. This paper reviews the progress of nonlethal damage management techniques for blackbirds within North Dakota and South Dakota since 1986.

METHODS

Management Area

The management area was east of the Missouri River in North Dakota and South Dakota and is marked by glacial deposits with low, rolling hills and water-filled depressions (Smith et al. 1964). The native vegetation is tall grass and mixed-tall grass prairie with much of the region converted to cropland and pasture. The climate is dry and subhumid with precipitation (<50 cm/year) substantially lower than potential evapotranspiration (Borchert 1950).

Nonlethal Techniques

The blackbird hazing program consisted of a single Piper Super Cub (PA-18), a pilot, and a gunner per district (Handegard 1988). Blackbirds were harassed out of the sunflower fields with low flying PA-18s, supplemented by shooting with a 12-gauge shotgun (Handegard 1988) using number 6 steel shot. During the first few years of the program, lead shot was used by the gunner. Once the birds were in the air, the pilot maintained a position between the blackbirds and the field to disperse the birds away the field.

Propane cannons are simple to operate, use inexpensive bottled propane gas, and produce a sound similar to that of a shotgun (Knittle and Porter 1988). An advantage of the propane cannon is that the timing of explosions can be controlled (Knittle and Porter 1988). Two styles of cannons were available to the sunflower producers. The M-4 is a single detonation cannon that can be set to detonate from 30 sec to 30 min and the M-8 cannon is a multi-detonation cannon that will fire 3 times in 25 sec, then fire another staggered 4-shot group in approximately 1 min. The timing between sequences can also be regulated.

Three types of pyrotechnics were offered as an alternative technique for reducing blackbirds damage. Cracker shells (a.k.a. shot tell scare shells) are explosive charges fired from a 12-gauge shotgun. The charge travels up to 250 yards down range and explodes with a loud sound. Bird bangers are pyrotechnics that are launched with a hand-held pistol. Each cartridge is ignited with a .22 blank. Bird bangers travel down range 120-145 feet and explode upon reaching maximum distance. Screamer sirens are also launched from a hand-held pistol. Screamer sirens travel down range 180-240 feet and scream the entire distance traveled.

Cattail management consisted of chemically controlling cattail-choked wetlands to remove primary blackbird roosts. Seventy percent of the cattails were removed with a combination of 2.25 quart per acre glyphosate (Rodeo herbicide, Monsanto, St. Louis, MO), 5 gallons per acre water, 0.1 quart per acre surfactant (Valent X-77 Spreader, Valent U.S.A. Corp., Walnut Creek, CA), and 0.25 quart per acre drift retardant (Chem-trol, Loveland Industries, Inc., Greeley, CO). The herbicide was applied from the beginning of August until the first hard frost.

RESULTS

Records were kept of all blackbird complaints on a yearly basis. Between 1986 and 1996, the North Dakota ADC program received almost 6,000 calls or an average of 538 calls/year (Figure 1). North Dakota had its peak blackbird complaint year in 1991, during the hazing program with 800 complaints. South Dakota ADC program began tracking calls in 1989 (Figure 1). In 1989-1996, South Dakota ADC program received 938 calls or an average of 117 calls per year.

The blackbird hazing program was conducted from 1986 through 1994. During that time period, North Dakota ADC amassed 19,656 hrs of flight time in PA-18s (Figure 2). The hazing program was conducted from 1986-1989 in South Dakota but hrs flown were not recorded. It can be estimated that approximately 200 hrs were flown each year in South Dakota during 1986-1989. From 1989 to 1994, the South Dakota ADC program flew for an additional 1,443 hrs (Figure 2). Blackbirds were occasionally killed by the aerial gunner as reinforcement of the hazing technique, but the primary focus of hazing was harassing blackbirds from sunflower fields. Blackbirds were hazed from mid-August until the end of September and in some years until mid-October.

Producers were loaned a mixture of single and multi-bang propane cannons on a first-come, first-served basis. Producers were required to provide their own propane bottles and propane. Beginning in 1989, both States began tracking the number of propane cannons loaned to producers for blackbird damage management (Figure 3). During 1989-1996, South Dakota loaned an average of 19 cannons per year and North Dakota loaned an average of 45 cannons per year.

During 1989 and 1990, North Dakota ADC program distributed a mixture of cracker shells, bird bangers, and screamer sirens (Figure 4) of which 2,300 and 3,795 cracker shells were distributed in 1989 and 1990, respectively. During the same time period, South Dakota distributed 250 cracker shells. Cracker shells were phased out due to their high cost ($1.11 per round, Reed-Joseph International Company, Greenville, MS 1997) when compared with bird bangers or screamer sirens with blanks ($0.37 per round, Reed-Joseph International Company, Greenville, MS 1997) and for safety reasons. The current management information system does not distinguish between bird bangers or screamer sirens: consequently the totals can not be separated for each device. From 1989 to 1996, North Dakota distributed 181,226 rounds of bird bangers and screamer sirens and South Dakota distributed 4,159 rounds of bird bangers and screamer sirens.

The cattail management program began in 1991 after several years of research (Bergman et al. 1997). During the first year of cattail management, the North Dakota ADC program treated 400 ha and the South Dakota ADC program treated 62 ha (Figure 5). The cattail management program is currently the largest blackbird damage program in both States. When the hazing program ended in 1994, the Congressionally-directed funds were shifted into the cattail management project. No cattails were treated in South Dakota during 1995 due to an earlier-than-expected frost. To date, North Dakota has sprayed 7,036 ha of cattails in 24 counties and South Dakota has sprayed 874 ha of cattails in 8 counties for blackbird damage management.

DISCUSSION

Sunflower damage surveys in North Dakota, South Dakota, and Minnesota revealed an estimated loss of $5.1 million in 1979 and $7.9 million in 1980 (Hothem et al. 1988). Substantial economic

losses encouraged Congress to direct funds for blackbird damage management in the Dakotas beginning in 1986 (Handegard 1988). At the onset of the nonlethal management, a survey was conducted by Linz et al. (1989) during 1986 in Ramsey and Benson Counties, North Dakota. The survey reported an average loss of 4.3% per field. A 1990 survey (652 respondents) stated that 33% of the growers in North Dakota had lost 5% or more, but the north central and central cropping districts had 22% of the respondents reporting >10% crop loss to blackbirds (Lamey et al. 1992). By 1992 (289 respondents), 39% of North Dakota sunflower producers had reported damage >5% and 17% had reported blackbird damage at >10% (Lamey and Lueke 1993). Sunflower production losses continued in 1994 with North Dakota and South Dakota producers having an average loss of 9.1% or $4,130 to blackbirds (North Dakota Agriculture Statistics Service 1995).

Humane, animal rights, and the majority of environmental groups prefer nonlethal techniques over lethal techniques. Using Congressionally-directed funds, ADC has been conducting nonlethal management of blackbird damage in conjunction with sunflower producers. As shown in this paper, the types and numbers of nonlethal techniques have been wide and varied. Each method has its advantages and disadvantages. The primary advantage of nonlethal damage management is that the animal is allowed to continue living whereas the primary disadvantage of nonlethal damage management allows the animal to continue reproducing and potentially increasing the population, which potentially increases crop losses.

ADC personnel are frequently contacted after cooperators have tried nonlethal techniques and found them to be inadequate for reducing damage to an acceptable level. Producers represented by the National Sunflower Association have gone on record requesting that lethal damage management be considered in conjunction with nonlethal damage management techniques (North Dakota Agricultural Statistics Service 1995, Lilleboe 1996). The U.S. Department of Agriculture, Animal and Plant Health Inspection Service, National Wildlife Research Center is currently testing the avian toxicant DRC-1339 to control blackbirds on spring staging areas in North Dakota and South Dakota (Lilleboe 1996). Should the research questions (i.e., impacts on nontargets species, raptors, and gallinaceous birds) be answered positively, ADC will complete the necessary National Environmental Policy Act documents and implement an operational DRC-1339 program in 1999.

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Figure 1. Number of Requests for Assistance with Blackbird Damage During the Years 1986 to 1996 in North Dakota and South Dakota

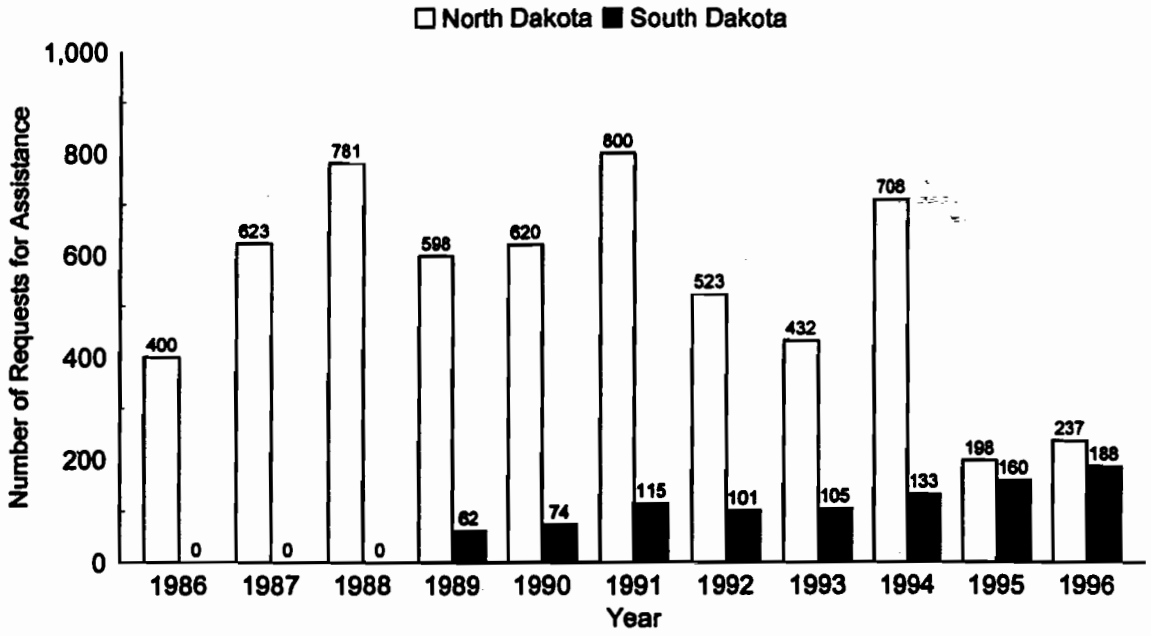

Figure 2. Number of Hazing Hours Flown in Piper Super Cubs for Blackbird Management During the Years 1986 to 1994 in North Dakota and South Dakota

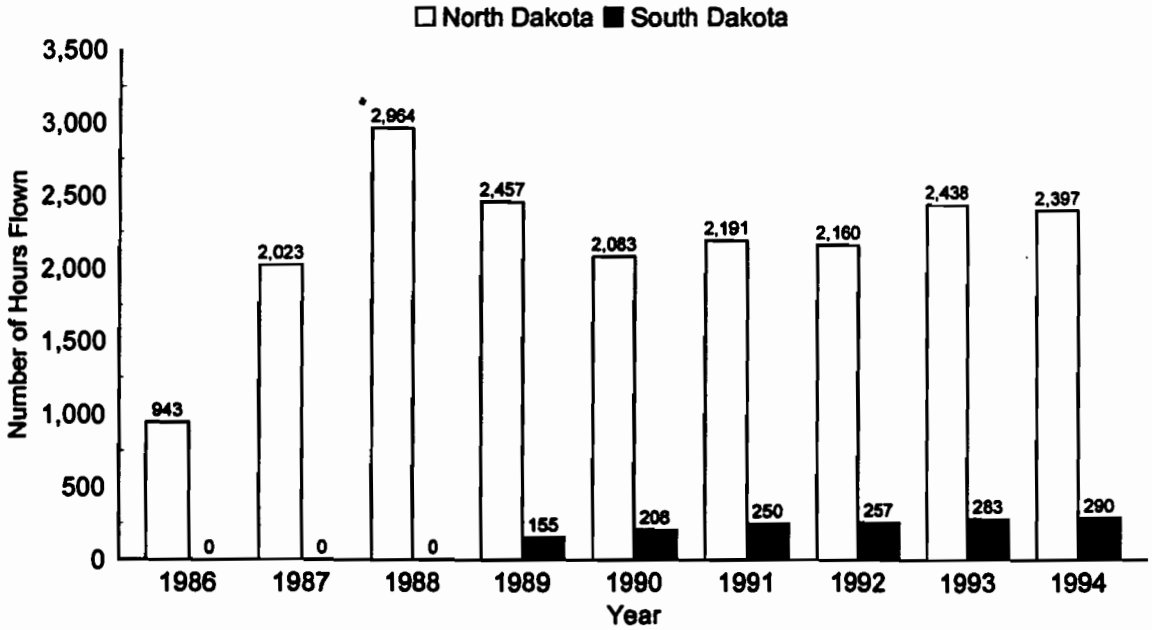

Figure 3. Number of Propane Exploders Loaned for Blackbird Management During the Yeas 1986 to 1996 in North Dakota and South Dakota

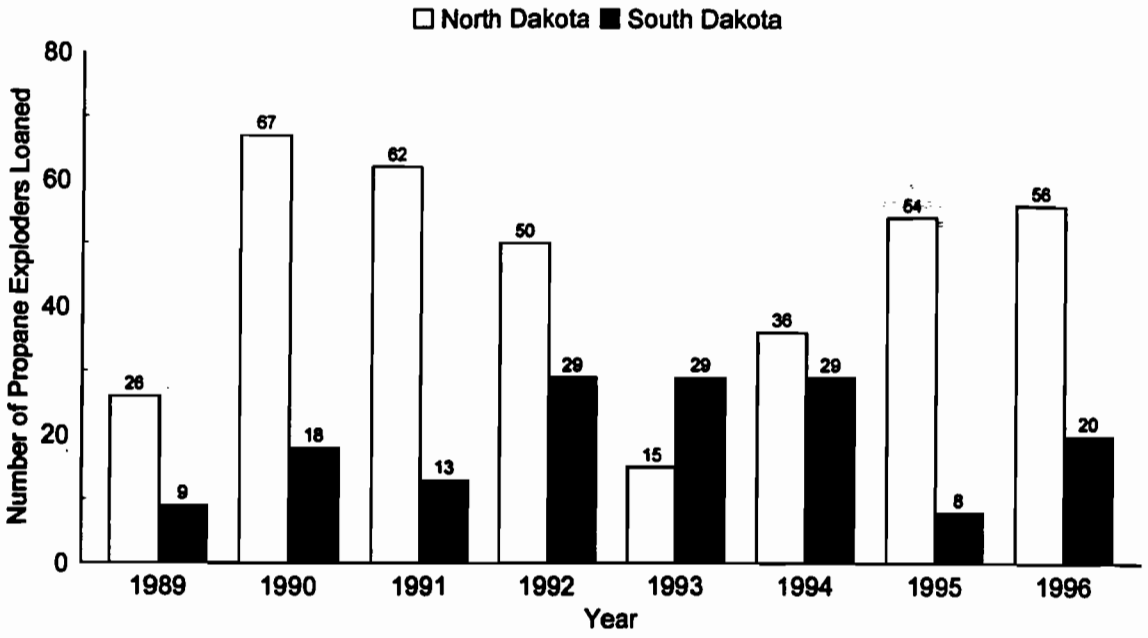

Figure 4. Number of Pyrotechnics Distributed for Blackbird Management During the Years 1986 to 1996 in North Dakota and South Dakota